

What Makes a Building Earthquake Resistant? Megan, my lab partner, and I reached the understanding that for a building to be earthquake resistant it needs to do one of two things- it needs to either be strong enough to withstand the earthquake's force, or it needs to be flexible enough to be able to sway with the earthquake. Bracing, or redistributing the building's weight helps the building become stronger. We found that bracing diagonally or in X's is most effective.

How Did we Make Our Building and Why Did We Use Specific Materials? We made a base isolation system out of a foamy pipe insulator tube that we cut into strips. We used it because it will cushion the bottom of the building, which would absorb some of the energy from the earthquake, and give it a little more flexibility to sway. The next portion of our building is a heptagon made of popsicle sticks that is about 22 popsicle sticks high. We made it a heptagon to make it a little thicker and heavier because we know that if the building is too flexible, it will just fall over on its side. Another thing that we did was put sets of springs on all of the corners to give it a little more bounce. The bounce will make the building move with the earthquake, instead of fight against it and possibly get damaged. After we realized that we needed to make our building taller, we made a smaller tower on to that was four popsicle sticks wide. A reason that we did this was to make it less top-heavy. In between layers of the building, we put little squares of pipe insulator. The pipe insulator did two things- it gave the building both height and flexibility. We realized that our building was too flexible. When we added the brick, the whole entire building accorded down. We added supports that connected the bottom to the top. Because the building was too flexible, and we feared it would topple over when it held the brick, or move so much that it broke off at UWM.

UWM At the end, our building withstood both the vibration table and the shake table and the load. A thing that went well was that the top of the building swayed, but not too much. This made the building sway, instead of take damage from the earthquake. The only thing that I don't think worked was the springs at the bottom. It was a little hard for me to see, but I think that they were to glued down to actually spring. The building remained completely intact.

What I Think was Good That We Did That Made Building Earthquake Resistant I think that some good things were the base isolation at the bottom, and both the flexibility of the top tower that let it move around, but the bracing that connected the top of the tower to the base that made sure that it only swayed within reason.

Challenges At first, we had a plan for a building but we had to completely scratch it. The plan involved using heavy metal pieces with holes. We were going to thread metal rods through the holes and use nuts and bolts to keep it in place. This design was WAY too heavy, so we had to start over. Some problems we faced with the new design was difficulty glueing down springs, and running out of popsicle sticks (in the end we found more.)

What I Would Do Differently There is nothing that I would do differently, because in the end I think everything worked out. If I had to change one thing though, it would probably be to put a little more thought into the base isolation because we were rushed, even though I think ours worked out fine.